

NOTICE INVITING TENDER

State Bank of India, Lucknow Circle invites two-bid online tenders through GeM portal for supply, Installation, Testing & Commissioning of **150 KWp On-Grid Roof Top Solar (PV) Power system with optimizer for module level monitoring** at **Lucknow Main Branch, Uttar Pradesh.**The other details of the tender are as under:

GEM/2024/B/4907346

Start Date:05.02.2024 End Date: 13.05.2024

| | | |
|----|--------------------------------|---|
| 1. | Scope of Work | <ul style="list-style-type: none"> a) Supply, Installation, Testing and Commissioning of ON-GRID 150 KWp monocrystalline Solar Power Plant with net metering & remote monitor feature with one year recharge by vendor. b) 2 to 1 power optimizer or 1 to 1 power optimizer as per inverter OEM compatibility. c) Minimum two nos inverter d) MS power coated panel with 02 nos 160 amp MCCB incomer and one 400 AMP 4 pole MCCB outgoing. e) Armoured aluminium cable 300 sq.mm from above 400 amp MCCB with 280 V AC SPD to Grid panel.400 amp 4 pole MCCB with enclosure to be provided at GRID inverter side with 280 V AC SPD. approximate 100 mtrs cable may be required, Therefore rate may be quoted after site visit. f) Real time power monitoring at module, string, and systems level. map & display Module array layout for each Inverter. g) Obtaining NOC from Directorate of Vidyut Surakhsa and permission from UPPCL at vendor cost. h) Net-metering from UPPCL at vendor cost i) Solar plate Cleaning arrangement at rooftop with CPVC water pipe. |
| 2 | Earnest Money Deposit (EMD) | Rs. 63,000/- (Rupees sixty three thousands only) in the form of Demand Draft issued by any Nationalized /Scheduled Bank drawn in favor of “ Asst General Manager (P&E), State Bank of India” LHO Lucknow payable at Lucknow . (Micro & Small Enterprises (MSE) registered under MSMED Act, 2006 will be eligible for concessions subject to submission of valid certificate) |
| 3 | Initial Security Deposit (ISD) | 2% of contract value (without GST value) to be submitted in the form DEMAND DRAFT in FAVOUR “ AGM(Premises & Estate), LHO, Lucknow and payable at Lucknow . With-in 7 days from date of receipt of work order. |
| | Security Deposit (SD) | <ul style="list-style-type: none"> a) 5% of contract value (without GST value) which (contract value, shall be deducted from final bill). SD shall be released without interest after 60 months from date of COMMISSIONING subject submission to satisfactory performance and monthly cleaning report. b) Security deposit shall be forfeited in case <ul style="list-style-type: none"> i) Monthly cleaning work not done. ii) Quarterly preventive checking not completed.. |
| 4 | Time of completion of work | 45 days from the date of generation of contract |

| | | |
|---|----------------------------|--|
| 5 | Terms of payment of Bills | <p>No advance is payable on material delivery. 95% payment will be made on successful Commissioning of the total 150 KWp system.</p> <p>5% will be held till completion of the warranty period of 5 years. However it can be converted into Bank Guarantee/ STDR lien in the favour of AGM(Premises & Estate), LHO Lucknow for the amount and same period.</p> |
| 5 | Liquidate Damage(LD) | 0.5% per week subject to maximum 5% of contract value. |
| 6 | Warranty period | 60 months from the date of commissioning solar power plant |
| 7 | Place of opening of tender | <p>Asst General Manager (P&E), SBI, 1st Floor, B wing, Local Head Office, Motimahal Marg, Lucknow-226001 07408408060 agmpne.lholuc@sbi.co.in</p> |
| 8 | Contact person (SBI) | <p>Pramod Kumar Manager (Electrical), SBI, 1st Floor, Local Head Office, Motimahal Marg, Lucknow-226001 8384826503 pramod.kumar7@sbi.co.in</p> |

ELIGIBILITY CRITERIA

1. **TURNOVER** : The Bidder should have minimum average annual turnover of **Rs. 20.0 Lacs** during last 3(three) Financial years (2020-21, 2021-22 & 2022-23) (Copies of balance sheet and profit and loss sheet to be uploaded of above period only)

2. **EXPERIENCE:**

The Bidder should have executed project for supply, installation, commissioning of ongrid rooftop solar power system during last seven financial years as on opening of bid, as per following criteria:

(i) **Single(01)** order of at least 80% of 150 KW = **120 KW** or

(ii) **Two(02)** orders of at least 50% of 150 KW = **75 KW** or

(iii) **Three(03)** orders of at least 40% of 150 KW = **60 KW**.

Satisfactory completion certificate issued by respective Buyer Organization should be uploaded with bid or in case of GeM portal GeM contract, CRAC and tax invoice raised to be uploaded.

3. The bidder must have full-fledged registered office in any of location **with-in geographical area of UTTAR PRADESH**. Copy of electricity bill/ GST certificate/ trade license/ House & water tax /ESI/ PF registration receipt etc to be uploaded. Document should not be more than 3 months old from date tender floating. **(Additional DOC 1)**

4. BOQ compliance and all tender terms conditions duly stamped and signed. Duly filled annexure-I.

TECHNICAL SPECIFICATIONS

1.1 INTRODUCTION:

common HT meter connection 278 KW. All PV module to be installed at the rooftop on MS truss structure. Vertical MS truss structure will be installed by the Bank and horizontal purlin of hot dip GI size 100x50x15x2 with necessary accessories to be installed by the vendor and solar PV module of minimum 550 watt to be installed on purlin.

Obtaining NOC from UPPCL/ VIDYUT SURAKSHA VIBHAG and net-metering for installation 150 KWP solar power plant shall be in the scope of vendor at their cost only. Bank will provide only necessary document for applying.

1.2 DEFINITION:

Solar PV system shall consist of following equipments/components.

- Solar PV modules consisting of **Mono Crystalline PV modules** with Linear performance with **25 year warranty**.
- Power Optimizer or DC/DC converter(2-1) with constant string voltage feature compatible with inverter for Real time power monitoring at module, string, and systems level with **25 years warranty**. **Two plates will have one power optimizer** (2-1 configuration and compatible with inverter) and portion of plates where 2-1 combination is not possible 1-1 optimizer to be installed. Rates must be quoted after site visit.
- Grid interactive Ongrid inverter compatible with inverter with **12 years warranty**.
- Real time **power monitoring at module, string, and systems level**
- Hot dip galvanized iron Mounting structures for solar PV module
- FRLS PVC wire Cables, heavy duty conduit pipe and accessories.

- Water pipeline with necessary for cleaning of solar plates.
- 3 Earthing per inverter.(LA, DCDB and ACDB)
- 1 no router with each inverter with M2M SIM with minimum one year recharge for internet connection for remote monitoring.

1.3 SOLAR PHOTOVOLTAIC MODULES:

The **Mono Crystalline Silicon 550 Wp** PV modules used must qualify to the latest edition of IEC PV module qualification test or equivalent BIS standards/ with valid ALMM approved. Modules deployed must use a **RF identification Rfid tag inside the laminate**. Vendor must have RFID tag reader to verify the module technical specifications at site. Randomly picked module **will be tested at site by Bank' Engineer/Official before installation**. Therefore all module to be tested before delivery by vendor. Bank may go for Flush test report through NABL approved LAB at the cost of vendor.

1.4 Power Optimizer or DC/DC converter(2-1)

Power Optimizer or DC/DC converter with constant string voltage feature and which is connected to PV modules to provide Maximum Power Point Tracking (MPPT) for mitigating all types of modules mismatch-loss, manufacturing individual module level tolerances and partial shading. Power Optimizer should also be capable for advanced, real-time performance measurement. Optimizer to be able to instantaneously clamp DC Voltage to 1 V DC (Safe DC) per optimizer when AC power is shut off for installer and fire-fighter safety. Real time power monitoring at module, string, and systems level.

1.5 Inverter compatible with power optimizer or DC-DC converter

Solar Grid Tie String Inverters should be designed to work with Power Optimizers Module Level MPPT (Module power point tracking) providing Constant string voltage and should have anti-islanding feature. Typical technical features of the inverter shall be as follows:

- Switching devices: IGBT.
- Control: Microprocessor /DSP.
- Nominal AC output voltage and frequency: 415V, 3 Phase, 50 Hz (In case single phase inverters are offered, suitable arrangement for balancing the phases must be made.).
- Output frequency: 50 Hz.
- Grid Frequency Synchronization range: + 3 Hz or more.
- Ambient temperature considered: -20o C to 80o C.
- Humidity: 95 % Non-condensing.
- Grid Frequency Tolerance range: + 3 or more.
- Grid Voltage tolerance: - 20% & + 15 %.
- No-load losses: Less than 1% of rated power.

- Inverter efficiency (minimum): >93%.
- THD: < 3%.
- PF: > 0.95.

a. Three phase PCU/ inverter shall be used .

b. PCU/inverter shall be capable of complete automatic operation including wake-up, synchronization & shutdown.

c. The output of power factor of PCU inverter is suitable for all voltage ranges or sink of reactive power, inverter should have internal protection arrangement against any sustainable fault in feeder line and against the lightning on feeder.

d. Built-in meter and data logger to monitor plant performance through external computer shall be provided.

e. The power conditioning units / inverters should comply with applicable IEC/ equivalent BIS standard for efficiency measurements and environmental tests as per standard codes IEC 61683/IS 61683 and IEC 60068-2(1,2,14,30) /Equivalent BIS Std.

f. The charge controller (if any) / MPPT units environmental testing should qualify IEC 60068-2(1, 2, 14, 30)/Equivalent BIS std. The junction boxes/ enclosures should be IP 65(for outdoor)/ IP 54 (indoor) and as per IEC 529 specifications.

g. up to 15% overloading on inverter capacity is acceptable. i.e 132 KW-150 KW solar inverter capacity is accepted

1.5. ARRAY/MODULE MOUNTING STRUCTURE:

- i. Hot dip galvanized MS structures shall be used for mounting the modules/ panels/arrays. Each structure will have angle of inclination as per the site conditions to take maximum insolation.
- ii. The Mounting structure should not be Non-invasive Ballast Type.
 - b. The upper edge of the module must be covered with wind shield so as to avoid bulk air ingress below the module. Slight clearance must be provided on both edges (upper & lower) to allow air for cooling.
- iii. The mounting structure should be as per latest IS 2062: 1992 and galvanization of the mounting structure shall be in compliance of latest IS 4759.
- iv. Adequate spacing shall be provided between two panel frames and rows of panels to facilitate personnel protection, ease of installation, replacement, cleaning of panels and electrical maintenance.
- v. Additional waterproofing shall be provided in the areas where RCC blocks are placed on the terrace.
- vi. The minimum clearance between lower edge of PV panel and terrace ground level shall be 150 mm to allow ventilation for cooling, also ease of cleaning and maintenance of panels as well as cleaning of terrace.
- vii. The PV array structure design shall be appropriate with a factor of safety of min. 1.5.
- viii. Each array may be provided with two bird repellents spikes at a level higher than the upper edge of the array. The location of the spike should be selected for minimum shadow effect.
- ix. The support structure shall be free from corrosion when installed.

- x. PV modules shall be secured to support structure using screw fasteners and/or metal clamps. Screw fasteners shall use existing mounting holes provided by module manufacturer. No additional holes shall be drilled on module frames. Module fasteners/clamps shall be adequately treated to resist corrosion.
- xi. Adequate spacing shall be provided between any two modules secured on PV array for improved wind resistance.
- xii. The structure shall be designed to withstand operating environmental conditions for a period of minimum 25 years.
- xiii. The structure should be appropriately designed to withstand high wind velocities up to 200 km per hour. (The bidder is required to submit a certificate from an authorized chartered engineer with regards to the strength and durability of the structure)

1.6 JUNCTION BOXES (JBs):

- a. The junction boxes are to be provided in the PV array for termination of connecting cables. The J. Boxes (JBs) shall be made of GRP/FRP/Powder Coated Aluminium /cast aluminium alloy/PC with full dust, water & vermin proof arrangement. All wires/cables must be terminated through cable lugs. The JB's shall be such that input & output termination can be made through suitable cable glands.
- b. Copper bus bars/terminal blocks housed in the junction box with suitable termination threads conforming to IP65 standard and IEC 62208 Hinged door with EPDM rubber gasket to prevent water entry. Single / double compression cable glands. Provision of earthing. It should be placed at 5 feet height or above for ease of accessibility.
- c. Each Junction Box shall have High quality Suitable capacity Metal Oxide Varistors (MOVs) /SPDs, suitable Reverse Blocking Diodes. Suitable earthing should be provided to SPD. The Junction Boxes shall have suitable arrangement monitoring and disconnection for each of the groups.
- d. Suitable markings shall be provided on the bus bar for easy identification and the cable ferrules must be fitted at the cable termination points for identification.

1.7 DISTRIBUTION BOARD:

- i. Distribution panel to receive the DC output from the array field.
- ii. DC DBs shall have sheet from enclosure of dust & vermin proof conform to IP 65 protection. The bus bars are made of copper of desired size and suitable capacity. CBs/MCB/SPDs shall be provided for controlling the DC power output to the PCU along with necessary earthing.

1.8 AC DISTRIBUTION PANEL BOARD:

Distribution Panel Board (DPB) shall control the AC power from PCU/ inverter, and should have necessary surge arrestors. Interconnection from ACDB to mains at LT Bus bar while in grid tied mode.

1.9 INTEGRATION OF PV POWER WITH GRID:

The output power from SPV would be fed to the inverters which converts DC to AC. AC feeds into the main electricity grid after synchronization. In case of grid failure, or low or high

voltage, solar PV system shall be out of synchronization and shall be disconnected from the grid. 4 pole MCCB 400 amp with enclosure isolation of inverter output with respect to the grid need to be provided.

1.10 REAL TIME POWER MONITORING AT MODULE LEVEL.

- i. The Monitoring System should be able to provide module level real time monitoring & Inverter data (web and mobile) without any additional data logger for lifetime without any additional charges or fee for 25 years. The monitoring system should display the below mentioned parameters/Features.
- ii. To provide logical and physical PV site visualization with real-time performance data for **each individual module** and for Inverter
- iii. To **map & display Module array layout for each Inverter**
- iv. To provide immediate fault detection and troubleshooting, efficient maintenance management and site profitability analysis.
- v. Monitoring App to be Easy available via web browser and mobile device App store for iOS& Play Store for Android
- vi. Should have a Configurable rule engine which automatically detects problems, issues status reports and sends alerts via e- mail.
- vii. Should have remote fault analysis and servicing options.
- viii. Provide the interactive charts and site layout make it easy for installers to ensure a system is functioning properly after installation

1.11 POWER CONSUMPTION:

Regarding the generated power consumption, priority need to give for internal consumption first and thereafter any excess power can be exported to grid. . Decisions of appropriate authority like DISCOM, state regulator may be followed.

1.12 LIGHTNING PROTECTION: 4 meter

The SPV power plants shall be provided with lightning & overvoltage protection. The main aim in this protection shall be to reduce the over voltage to a tolerable value before it reaches the PV or other sub system components. The source of over voltage can be lightning, atmosphere disturbances etc. The entire space occupying the SPV array shall be suitably protected against Lightning by deploying required number of Lightning Arrestors. Lightning protection should be provided as per IEC 62305 standard. Lightning conductor should be made of 25 mm dia 4000mm long GI spike as per Provision of IS 2309-1969. Necessary concrete foundation to be provided for holding Lightning conductor considering the wind speed. It should be earthed through 20 x 3 GI flat from pit with proper insulation. Height of Lightning conductor from array structure should be min 4 meter.

1.13 SURGE PROTECTION:

Internal surge protection shall consist of three MOV type surge-arrestors connected from +ve and -ve terminals to earth (via Y arrangement)/ SPD (type II). SPD should be provided in AC and DC side of solar PV system. It should have protection voltage of 2.5kv and nominal discharge current of 5kA (8/20) micro sec. SPD earthing terminals should be connected to earthing system.

1.14 EARTHING PROTECTION:

- a. Each array structure of the PV yard should be grounded/ earthed properly as per IS: 3043-1987. In addition the lighting arrester/masts should also be earthed inside the array field. Earth Resistance shall be tested in presence of the representative of Bank engineer as and when required after earthing by calibrated earth tester. PCU, ACDB and DCDB should also be earthed properly. **Minimum 03 GI pipe earth pit** to be provided as per relevant IS code.
- b. Earth resistance shall not be more than 5 ohms. It shall be ensured that all the earthing points are bonded together to make them at the same potential.

1.15. Grid Islanding:

- a. In the event of a power failure on the electric grid, it is required that any independent power-producing inverters attached to the grid turn off in a short period of time. This prevents the DC-to-AC inverters from continuing to feed power into small sections of the grid, known as “islands.” Powered islands present a risk to workers who may expect the area to be unpowered, and they may also damage grid-tied equipment. The Rooftop PV system shall be equipped with islanding protection. In addition to disconnection from the grid (due to islanding protection), disconnection due to under and over voltage conditions shall also be provided.
- b. A manual disconnect 4pole isolation switch (MCB/ MCCB) as per max inverter output current beside automatic disconnection to grid would have to be provided at utility end to isolate the grid connection by the utility personnel to carry out any maintenance. This switch shall be locked by the utility personnel.

1.17 CABLES:

The Cable should be so selected that it should be compatible up to the life of the solar PV panels i.e. 25 years. The ratings given are approximate. Bidder to indicate size and length as per system design requirement.

The size of each type of DC selected shall be based on minimum voltage drop however the maximum drop shall be limited to 1%.

The size of each type of AC cable selected shall be based on minimum voltage drop however the maximum drop shall be limited to 2%.

1.18 TOOLS & TACKLES AND SPARES:

Operation and maintenance guide and consumable spares like fuses should be provided by vendor.

1.19 DANGER BOARDS AND SIGNAGES:

Danger boards should be provided as and where necessary as per IE Act. /IE rules as amended up to date. Three signage shall be provided one each at battery –cum- control room, solar array area and main entry from administrative block. Text of the signage may be finalized in consultation with Bank.

1.20 DRAWINGS & MANUALS:

Two sets of Engineering, electrical drawings and Installation and O&M manuals are to be supplied. Bidders shall provide complete technical data sheets for each equipment giving details of the specifications along with make/makes in their bid along with basic design of the power plant and power evacuation, synchronization along with protection equipment.

I. Approved ISI and reputed makes for equipment be used.

II. For complete electro-mechanical works, bidders shall supply complete design, details and drawings for approval to Bank before progressing with the installation work.

1.21 PLANNING AND DESIGNING:

i. The bidder should carry out the considering optimal usage of the space, material & labour. The bidder should submit the array layout, drawings along with shadow analysis report to Bank for approval. Bidders should submit detailed SLD for approval.

ii. Bank reserves right to change/modify sub-systems and components at any stage as per the local site conditions/ requirements.

iii. The bidder shall submit preliminary drawing for approval & based on any modification or recommendation, if any. The bidder shall submit three sets and soft copy in CD of final drawing for formal approval to proceed with installation work.

1.22 DRAWINGS TO BE FURNISHED BY BIDDER AFTER AWARD OF CONTRACT:

i. The Contractor shall furnish the following drawings Award/Intent and obtain approval.

ii. General arrangement and dimensioned layout Schematic drawing showing the requirement of SV panel, Power conditioning Unit(s)/ inverter, Junction Boxes, AC and DC Distribution Boards, meters etc. Structural drawing along with foundation details for the structure.

iii. Itemized bill of material for complete SV plant covering all the components and associated accessories.

iv. Layout of solar Power Array

APPROVED MAKE

| | | |
|---|---|---|
| 1 | Solar PV modules (Mono crystalline only) | Vikram Solar/ Waaree Solar/ Bluebird/ Tata Power Solar Systems Ltd./ Rayzon/ Renewsys / EMVEE/ Adani or equivalent valid MNRE ALMM approved |
| 2 | Inverters: | Solar age /Polycab/ Sungrow/Growwatt or equivalent BIS approved / relevant IEC approved |
| 3 | DC Power optimizer | (same make of inverter or compatible with inverter having real time monitoring module level) |
| 4 | Real time Monitoring system | Same as of offered make of inverter or compatible with inverter having real time monitoring module level. |
| 5 | DC cables (4 sq.mm) | Havells/ Polycab/ KEI /Finolex/L&T/ KEI/ KEC/ UNIVERSAL/ NICCO Equivalent BIS approved |
| 6 | MCCB | ABB/Schneider//L&T or Equivalent BIS approved |
| 7 | DC Distribution Board, MC4 Connectors, Surge protection (spd) | Elmex/Phoenix/Citel/Schneider/ or Equivalent BIS approved |
| 8 | AC flexible copper cable (ter to MCCB) | Havells/ Polycab/ KEI /Finolex/L&T/ KEI/ KEC/ UNIVERSAL/ NICCO Equivalent BIS approved |
| 9 | AC aluminium armoured aluminium cables (25 sq.mm for each inverter) | Havells/ Polycab/ KEI /Finolex/L&T/ KEI/ KEC/ UNIVERSAL/ NICCO Equivalent BIS approved |
| <p>Important: Please Tick (/) the make of materials considered in the Tender.</p> <p>The vendor has to comply with all State & Central Government norms for choosing the make, supply and erection.</p> | | |

Note: -

1. The contractor should obtain prior approval from SBI before placing order for any specific materials. All materials should conform to relevant standards and codes of BIS. Materials with I.S.I. mark shall be used duly approved by the SBI Engineer.
2. Any material is found to be not up to the mark, the contractor will have to produce original bills/certificate from the manufacturer or his authorized Distributor for authenticity and genuineness of the material for consideration and as per make approved by the SBI. The same will not be considered for payment.

Signature of contractor With Seal

ANNEXURE-I

(List of offered make considered in price evaluation by vendor as per technical specification of tender)

| S.No | Item Name | Offered Make by bidder |
|------|---|------------------------|
| 1 | Solar PV modules (mono crystalline 550 Wp ALMM approved only) | |
| 2 | Inverters | |
| 3 | DC Power optimizer | |
| 4 | Real time Monitoring system for module level monitoring and weather temperature to be available on app | |
| 5 | FRLS DC cables (4 sq.mm) | |
| 6 | DC Distribution Board with control fuses and SPDs MC4 Connectors (02 nos) | |
| 7 | 160 amp, 4P, MCCB, 25 KA with enclosure (02 Nos) 400 amp, 4P, MCCB, with SPD 280 V (02 Nos) | |
| 8 | 4x35 sq.mm + 16 sq.mm multi strand Copper flexible cable from inverter to ACDB | |
| 9 | AC Armoured aluminium cables (300 sq.mm from 400 AMP MCB to existing Grid panel approx. 100 Mtrs with road cutting and hume pipe /cable tray work) | |

Power optimizer and inverter should be preferable same make. In case of different makes undertaken from both manufacturer to be uploaded that their product are compatible. Only single make to be mentioned for which rate quoted by the vendor.

Signature of contractor With Seal